BUSH HOG®

Mid Mount Zero Turn Mower
Grass Catcher
Operator's Manual

OPERATION ● MAINTENANCE

208 $4.00 50038103

CONGRATULATIONS!

You have invested in the best implement of its type on the market today.

The care you give your Bush Hog implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Bush Hog will be glad to provide you with a new copy. Order from Bush Hog, P. O. Box 1039, Selma, Alabama 36702-1039.

As an authorized Bush Hog dealer, we stock genuine Bush Hog parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Bush Hog equipment, and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED
BUSH HOG DEALER

BECAUSE BUSH HOG MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE** THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.

MID MOUNT ZERO TURN MOWER
GRASS CATCHER
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RETAIL CUSTOMER'S RESPONSIBILITY UNDER THE BUSH HOG WARRANTY

It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.

It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's responsibility to deliver the product to the authorized Bush Hog Dealer, from whom he purchased it, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five (45) days of failure.

It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.

BUSH HOG®
Performance You Can Count On℠

LIMITED WARRANTY

★★★

IMPORTANT FEDERAL LAWS AND REGULATIONS* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such).

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

This Act Seeks:
"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer—
(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.
(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations

Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:

1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

Child Labor Under 16 Years Old

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

Safety Alert Symbol

This Safety Alert Symbol means: **"ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!"**

This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in death or serious bodily injury.

Safety Signs *Signal Words*

The signal words **DANGER, WARNING, AND CAUTION** are used on the equipment safety signs. These words are intended to alert the viewer to the existence and the degree of hazard seriousness.

⚠ DANGER

White letters on **RED**

This signal word indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Black letters on **ORANGE**

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

It may also be used to alert against unsafe practices.

⚠ CAUTION

Black letters on **YELLOW**

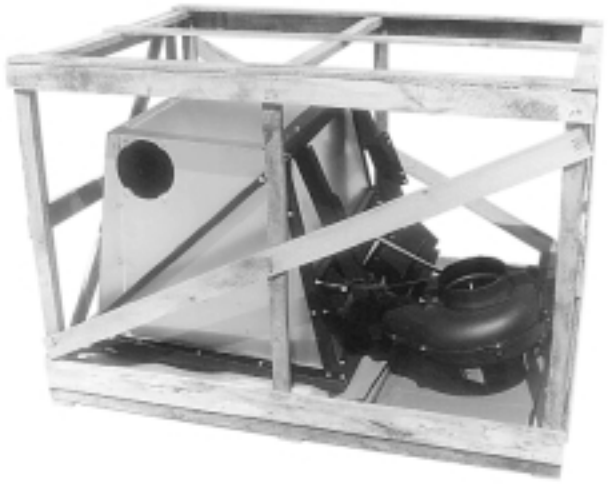
This signal word indicates a potentially hazardous situation exist which, if not avoided, may result in minor or moderate injury.

It may also be used to alert against unsafe practices.

SECTION I
INTRODUCTION AND DESCRIPTION

Figure 1 MMGC-300 On Bush Hog Mid Mount ZT

Figure 2 Complete Machine In Shipping Crate



1-1 Introduction

We are pleased to have you as a return Bush Hog customer. Your MMGC-300 has been designed to give you a low maintenance, simple, and effective way to collect the grass clippings from your Bush Hog Mid Mount ZT mower. This manual is provided to give you the necessary instructions to properly mount and operate the MMGC-300 on your ZT mower. Please read this manual thoroughly. Understand what each control is for and how to use it. Observe all safety decal precautions on the machine and noted throughout the manual.

Note: all references made to right, left, front, rear, top or bottom are as viewed from the normal operator's position on the ZT mower.

1-2 Description

The MMGC-300 Grass Catcher, Figure1, is designed for turf maintenance where there is a need to collect the grass clippings as the ZT mower cuts the turf. It is also good for picking up leaves and twigs in pre-season and post-season clean-up.

The blower, mounted on the right side of the unit, uses a belt and pulley system from the engine PTO shaft. Drive train protection comes through belt slippage. The blower draws grass clippings from the discharge area of the cutter deck up to the aluminum container mounted over the rear portion of the ZT frame. The operator can engage the blower with a push of the over-center linkage on the right side of the unit. Once the container is full of clippings, the operator can easily push and raise the lift handle, releasing the container's rear door and the container will pivot towards the ground.

SECTION II
PREPARATION FOR USE

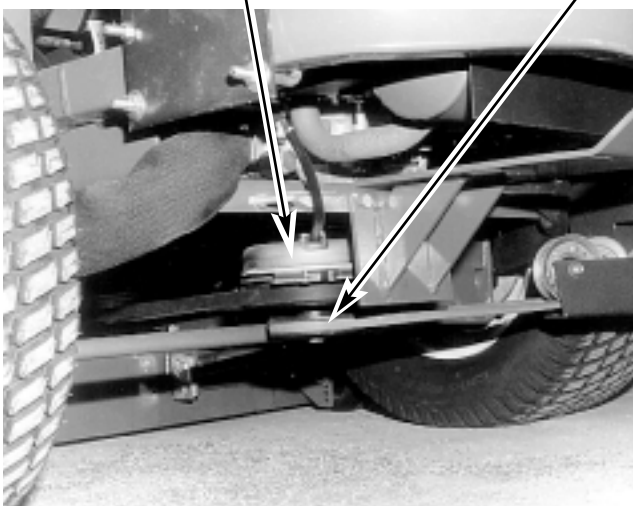
2-1 ZT Modification Of Zero Turn

Carefully dismantle wooden shipping crate from around the components. Cut retaining straps and separate the parts. The grass container will have various parts located inside. Remove and sort all parts for easy identification.

NOTE: Before each step of assembly it will help to study the exploded drawings on pages7, 8, and 10.

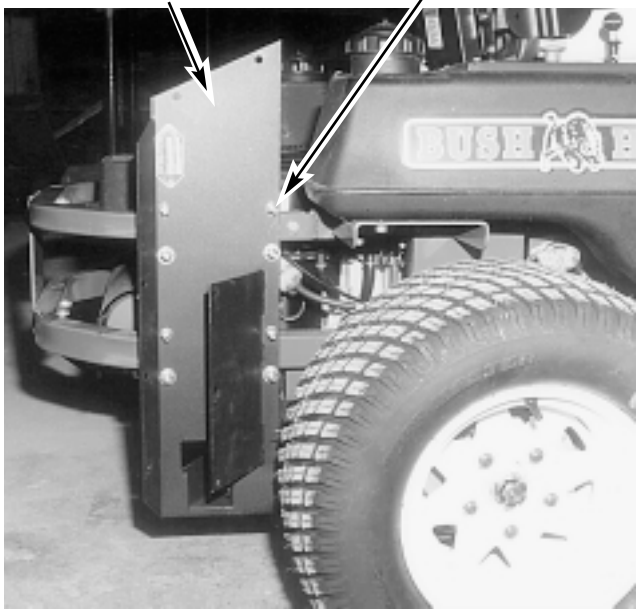
From the underside of the ZT engine remove the bolt and bushing from the electric clutch assembly. Replace these parts with the pulley and longer fastener that will power the grass catcher blower. Note that the center of the hub that is extended should be upward toward the engine. (Figure 3) Torque the bolt to 55 ft./lbs.

Figure 3 Electric Clutch Assy. Grass Catcher Pulley



Align right main frame leg against the ZT frame joint and perpendicular to the frame. Fasten with (4) 3/8 x 2 x 2-1/2" U-blots from the inside out. Flatwashers should be used over the slotted holes at the bottom leg of each U-bolt. (Figure 4)

Figure 4 Right Main Frame Leg U-Bolt



Assemble left main frame leg to opposite side of the ZT frame as shown. (Figure 5)

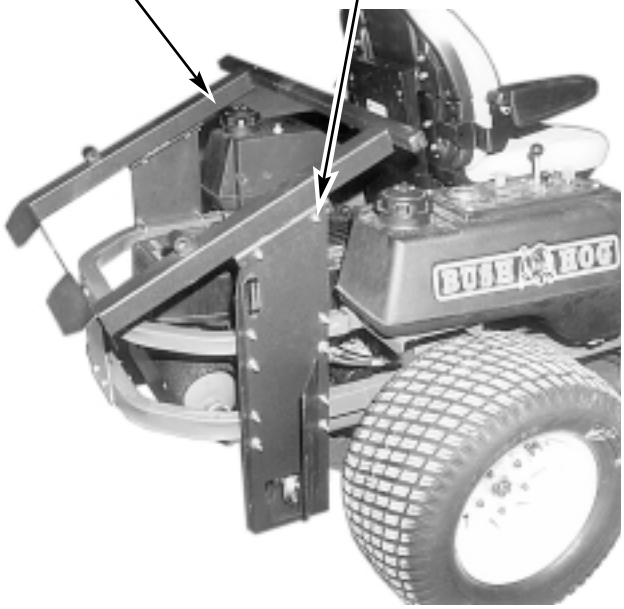
Figure 5 Left Main Frame Leg

2-2 Preparing To Mount Grass Container

Remove the rue-ring cotter pins from the bottom ends of the door opening linkages and disconnect the linkages.

Remove hair pin clips, washers and pivot pins that connect the mainframe to the grass container. The parts may then be separated. Place the mainframe onto the mainframe legs and fasten with (4) 3/8 x 1" bolts and locknuts. (Figure 6)

Figure 6 Mainframe 3/8 x 1" Bolts



2-3 Attaching The Lift Handle To The Aluminum Grass Container.

The various parts of the handle assembly must be attached to the container frame. Figure 7 shows the orientation and location of the components. Slide the lift handle into the slot in the bracket on the grass container. It may be necessary to remove the handle grip to allow the handle to fit through the slot.

Before attaching the handle, hook one end of the spring into the hole on the underside of the handle. Hook the other end of the spring into the open hole in the bracket. Fasten the handle to the frame using 3/8-16 x 2" hex bolt and two 3/8" serated flanged hex nuts. The handle must be able to move freely in the slot in the bracket. If not, check the spacing of the parts on the pivot point bolt. At this point the handle can pivot back and forth in the slot, but the spring pulls the handle in towards the grass container. With the handle in place, fasten the ball joint, (Figure 9) to the end of the rod. Tighten to approximately half way down the threads of the rod. slide the ball joint into the hole on the latch hook. Tighten nut on end of ball joint. Attach opposite end into the latch handle (Figure 7). Place a washer on the rod and use a cotter pin to hold in place. Adjust rod to allow hook to close the box completely.

Refer to Figures 7, 8, 9 and 10 for exploded parts drawing and photogrtaphs of complete assembly.

Figure 7
Lift Handle Assy.

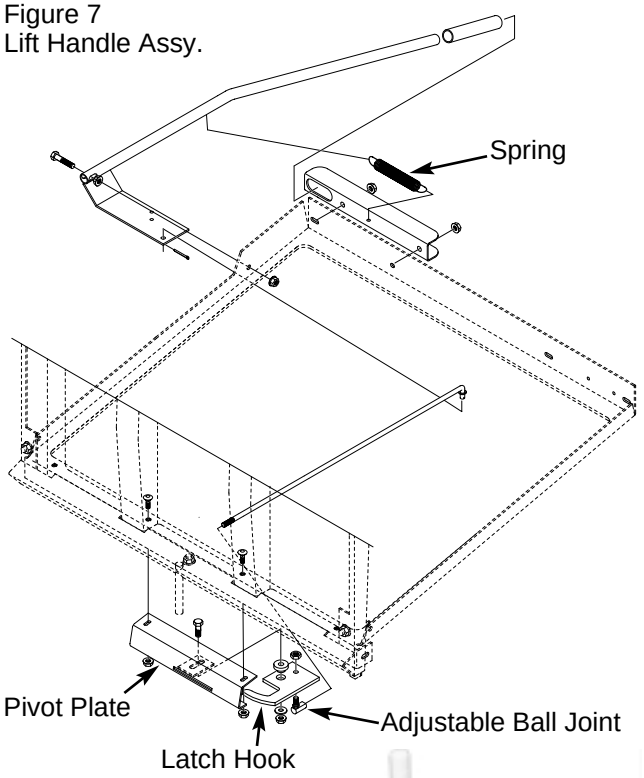
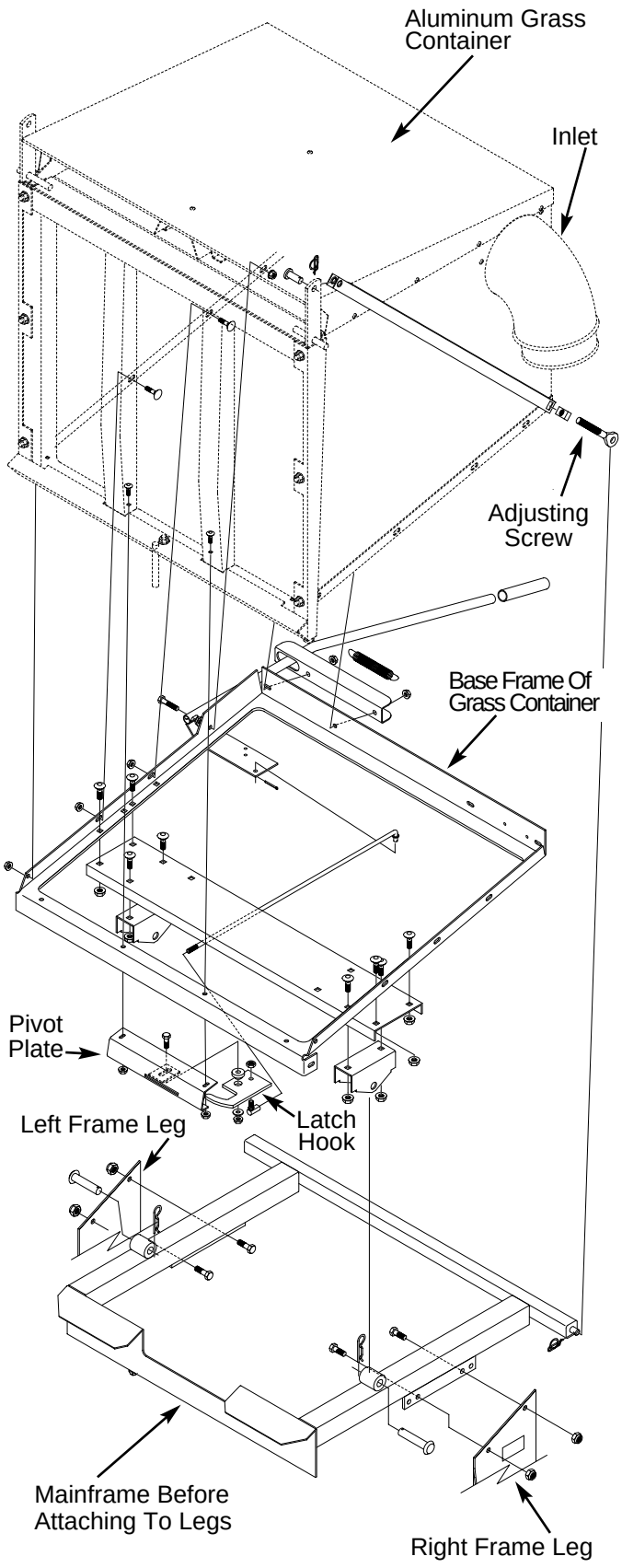


Figure 8
Grass Container With
Handle Attached

Figure 9 Latch Hook Mechanism Assembled

Figure 10 Grass Container Assembly



2-4 Attaching The Grass Container To The ZT Mower

NOTE: IT IS RECOMMENDED FOR THREE PEOPLE TO ASSIST IN THE MOUNTING OF THE CONTAINER.

With three people available, two can lower the container onto the frame while the third person inserts the pivot pins through the holes. Insert the pins from the outside to the inside. Secure with flat washers and hair pin clips.

Reattach the bottom ends of the door opening links to the main frame using the rue-ring cotter pins that were previously removed.

To test the functioning of the dump mechanism, pull the lift handle,(Figure 7), away from the unit, and lift upward. The door of the container should open and the box should pivot clockwise towards the ground.

2-5 Grass Container Inlet Attachment

The inlet, (Figure 10) will need to be attached to the container. Open the container, push the inlet, from the inside of the container through the hole in the container to the outside. Orient the inlet opening to face the ground. Use the tabs on the inside of the box to hold the inlet in place. It is recommended that two people perform this step. That way, one person on the inside of the container can position tabs, while the other person tightens the bolts. Looking at the outside of the container, the most difficult tab to tighten down will be the tab at the 4-5 o'clock position. Tighten that tab first. Then proceed to tighten the others.

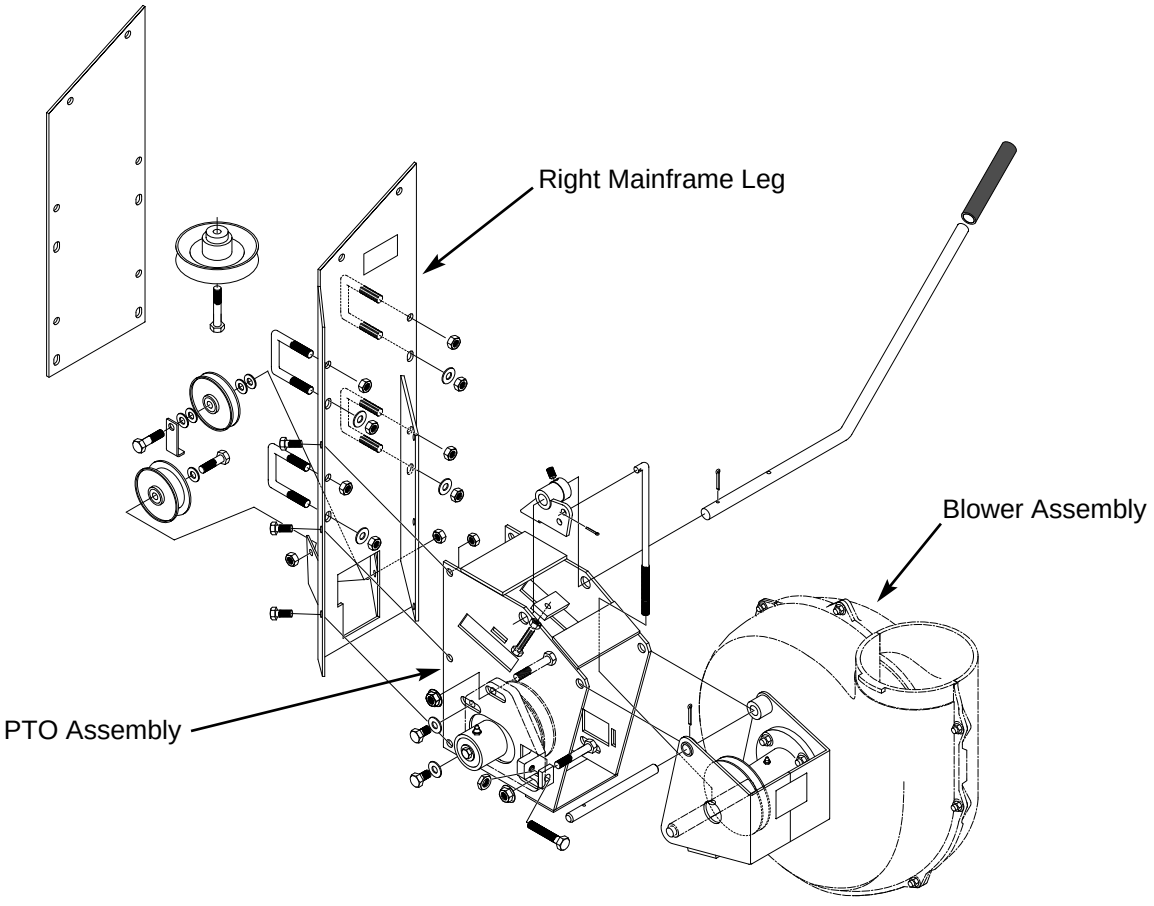
2-6 Adjustment Of The Dump Mechanism

The linkage may be adjusted in two places, at the adjusting screw and the latch assembly items. See Figures 7 & 10 for visual clarification. To change the amount of pivot of the container, screw the adjusting screw in or out. To adjust the latch, change the length of the latch rod by screwing the latch adjusting ball joint in or out. The latch hook pivot should be in the middle of the mounting slot in the latch hook pivot plate. Slide the pivot back or forth and then retighten.

2-7 Mounting The Blower Assembly To The Right Mainframe Leg

In Figure 11, the orientation and the pieces required are shown in the exploded drawing. Position the PTO assembly in place between the "lips" of the right mainframe leg. Fasten with six 3/8 x 1" bolts and locknuts, from the outside to the inside.

Figure 11



2-8 Belt Installation

Place the small belt into place over the PTO pulley only. It will hang in place. Install the larger of the two belts around the engine pulley, under the two idlers, and around the PTO pulley. Install the loose end of the smaller belt around the pulley on the blower impeller.

Adjust the idler adjustment bolt so that there is 1/2" deflection, with 8-9 lbs. of pressure between the engine pulley and the flat idler. (Figures 12 & 13)

Figure 12 PTO Assembly With Belts Installed

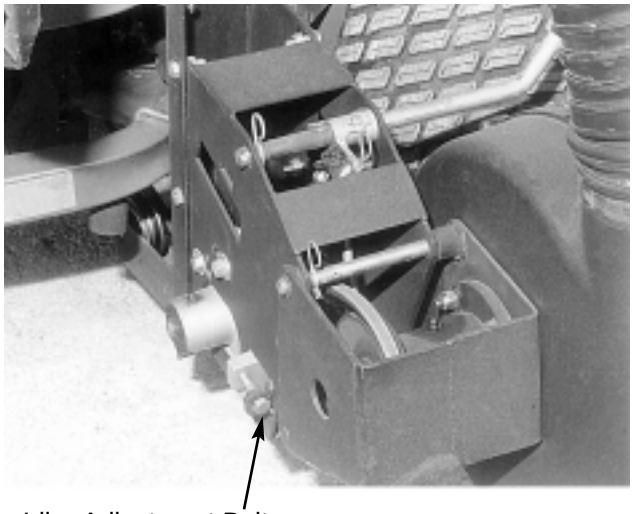
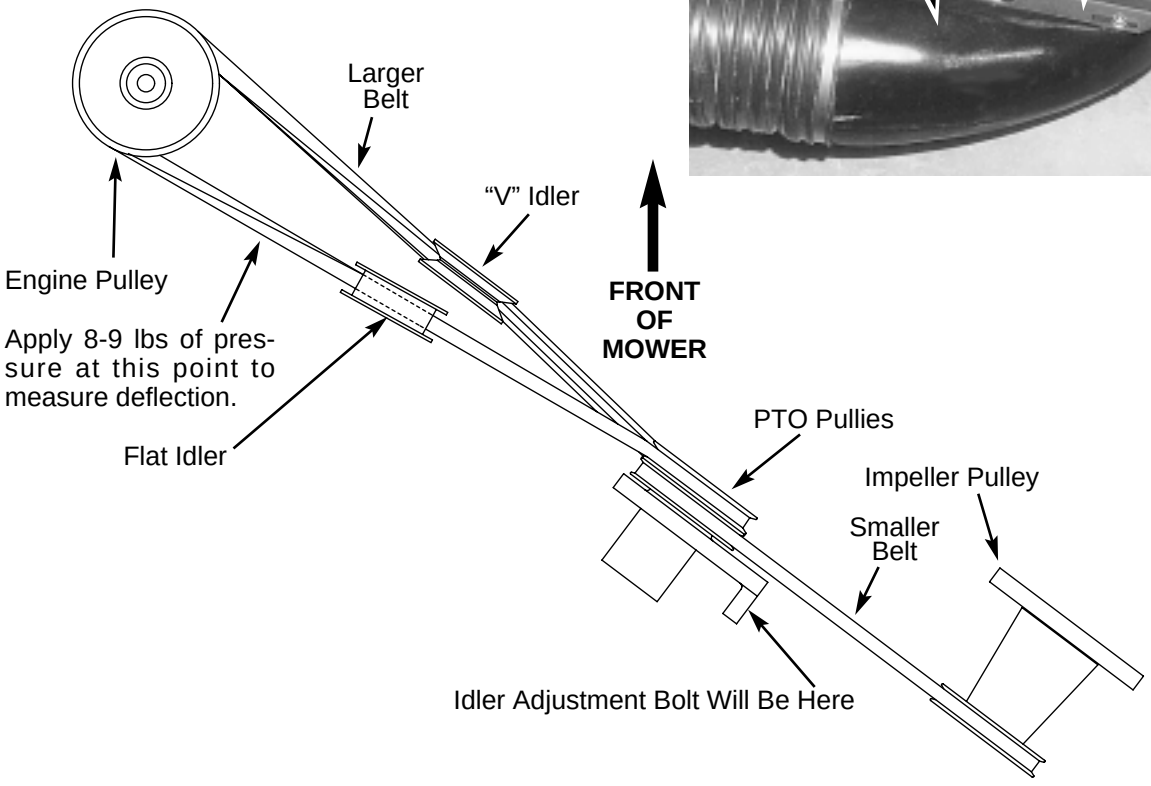


Figure 13

BELT DIAGRAM AS VIEWED FROM ABOVE

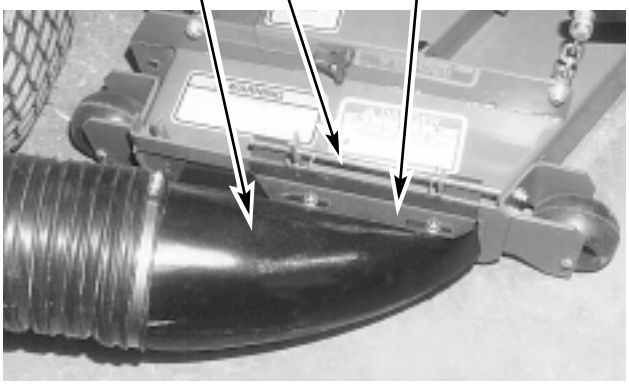


2-9 Attachment Of The Deck Boot To The ZT Mower Deck

There are three 3/8 x 1" cap screws and nuts holding the discharge chute assembly to the mower deck. For the deck boot, (Figure 14) to attach to the cutter deck, the cap screws should be removed and the discharge chute removed from the deck. The boot rod will replace the cap screws and create a mounting surface for the deck boot. Slide the boot rod through the forward two holes on the cutter deck. Slide the rod through until the cross-drilled holes are both between the first deck tab and second deck tab. Then push two hair pin clips into the cross drilled holes. The pins are positioned to keep the rod from sliding too far through the holes. See Figure 14.

Fasten the boot plate to the boot using 3/8 x 1" carriage bolts inserted from the inside of the boot. This will prevent grass from building up on the bolts. Use 3/8" serated, flanged lock nuts on the bolts, but do not tighten at this time. with the rod in place, slide the boot plate tabs under the rod. Allow the boot to rotate down and rest against the cutter deck opening. Adjust the boot location to cover the deck opening and tighten the lock nuts.

Figure 14



2-10 Adjustment Of The Lengths Of The Hoses

THE HOSES IN STEPS 2-11 AND 2-12 MUST BE CUT TO FIT YOUR MACHINE. FOLLOW STEPS 2-11 AND 2-12. DO NOT CUT THE HOSES UNTIL YOU HAVE TRIED TO FIT THEM TO YOUR MACHINE. REMEMBER THAT THE HOSES HAVE TO BE LONG ENOUGH TO ADJUST FOR THE BLOWER ASSEMBLY'S MOVEMENT AS WELL AS ALLOW FOR ENOUGH CLAMPING SURFACE BETWEEN THE INLET, BLOWER ASSEMBLY, AND THE DECK BOOT.

2-11 Attachment Of The Upper Hose

Slide a 5"-6" upper hose clamp onto both ends of the 6" x 36" upper hose (Figure 15). Then slide one end of the 6" x 36" upper hoseonto the Inlet. Make sure there is about a two-inch overlap between the hose end and the container inlet. Proceed to slide the opposite end of the 6" x 36" upper hose onto the outlet of the blower assembly. See Figure 15 for details. Make sure the ends of the hose are clearly attached to the Inlet and the blower assembly inlet. Tighten the hose clamps.

2-12 Attachment Of The Lower Hose To The Blower Assembly

Slide 7"-8" hose clamp (Figure 15) over both ends of the lower hose. Then proceed to slide the lower hose onto the blower cone. Tighten the hose clamp. The assembly should look like Figure 16.

Figure 15 Hose Assembly

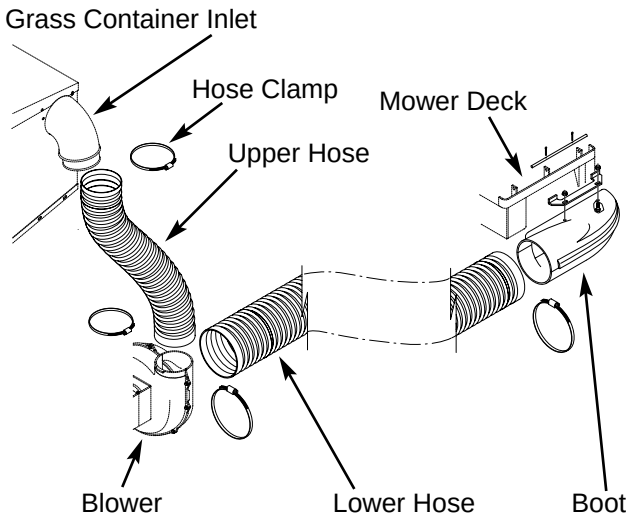
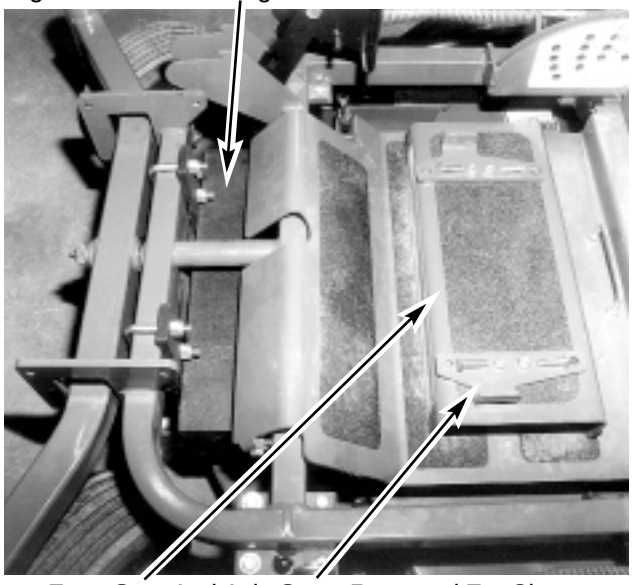


Figure 16

2-13 Attachment Of The Lower Hose To The Boot

Take the unattached end of the lower hose and slide it over the circular end of the boot. Use the lower hose clamp to secure the hose to the boot. The assembly should look like Figure 14.

Figure 17 Front Weight Installed



Front Step And Axle Stops Removed For Clearance

2-14 Front Weight Assembly

Remove front step and axle stops from ZT to allow working room. Place U-bolts from front to rear around front of frame (not the axle). Place the weight in place against the frame rail and over U-bolts. The largest part of the weight goes toward the rear. Fasten with lock nuts. Replace the axle stops and front ZT step. (Figure 17)

2-15 Tips On Mowing With The MMGC-300 Grasscatcher

To obtain the maximum effectiveness from your MMGC-300 Grasscatcher the tips listed below should be followed:

* Watch your speed- Normal conditions will allow a speed of up to approximately 5 mph, but thick, heavy damp conditions will require reduced ground speed.
* Mow with sharp blades-A sharp blade cuts cleaner.
* Wet Grass and leaves will decrease effectiveness and increase horsepower requirements.
* Mow at higher cutting heights - Remove and mulch no more than 2" of grass length with each mowing. (Experts recommend not cutting off more than 1/3 of the grass blade length at any given time.
* Mow twice, at different height settings, (high, then low), if grass is extra tall.
* Remember that horsepower requirements will vary with the mowing conditions such as type and height of turf grass, moisture content, amount of leaves, whether the terrain is flat or hilly, etc.

SECTION III
OPERATING INSTRUCTIONS

3-1 General Safety

Only qualified people familiar with this operator's manual and the ZT operator's manual should operate this machine.

3-2 Operation

A. Perform BEFORE EACH USE maintenance list in paragraph 4-1.
B. Start ZT Lawnmower.
C. With ZT Lawnmower at high idle speed, engage the cutter deck.
D. While seated in the operator's seat, rotate the handle of the grass catcher away from the ZT. Continue to rotate the handle until it stops in an over center position. With the blower engaged, you can proceed to operate the control levers of the ZT.

NOTE: If the grass catcher does not appear to be collecting the grass clippings. Disengage the deck, proceed to Section 3-3, and review the Section 4-3, in this manual.

3-3 Disengagement Of Blower

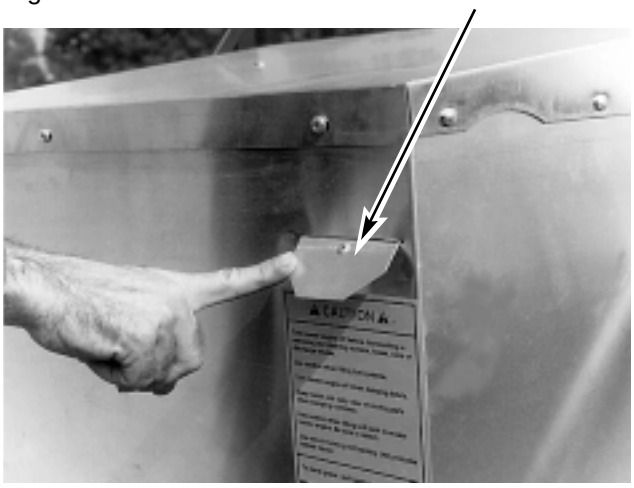
A. To disengage the blower, rotate the handle, on the control panel side of the unit, towards the ZT.

NOTE: the blower will continue to spin. DO NOT TOUCH blower, pulleys, or the belt until the tractor is turned off. DO NOT adjust the belt tension until the tractor is turned off. Refer to Section 4-3 of the manual.

3-4 Unloading Grass Catcher Container

NOTE: the grass catcher container is full or nearly full once the tab on the parking brake side of the tractor is flush with the side of the grass catcher container. See Figure 18.

Figure 18 Grass Catcher Full Indicator Tab



A. Stop the forward movement of the ZT tractor.
B. Disengage the cutter deck
C. Disengage the blower
D. Push the grass catcher handle, on the parking brake side of the tractor, away from the unit. While holding the handle pushed away, move the handle upward. The container door will swing upward and the container will rotate downward. The container will release its contents.
E. Once the contents of the container have fallen out, the container is ready to move back into its normal operating position. With the handle on the parking brake side of the unit pushed away from the unit, pull the handle downward until it stops. Move the handle towards the center of the tractor. This motion will allow the latch to lock back into collection position.

NOTE: If you do not hold the handle away from the tractor as you pull the handle downward, the latch will not lock and the container can unexpectedly release the contents collected.

SECTION IV
Maintenance

4-1 Maintenance Check List

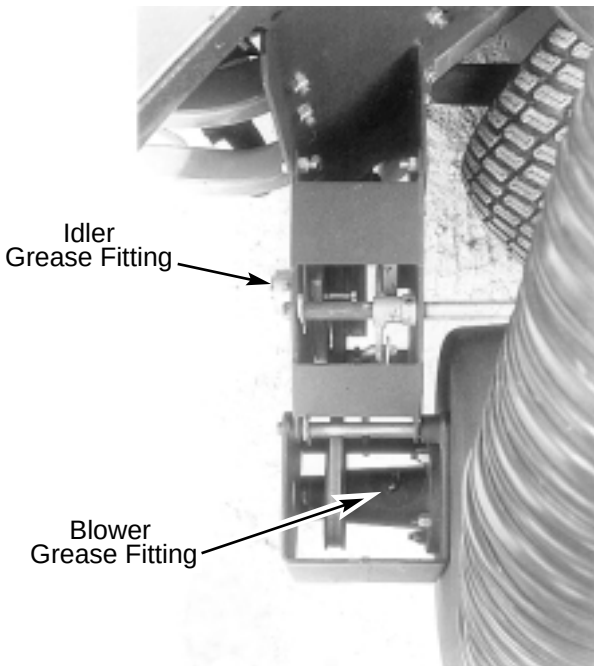
Before Each Use

1. Check blades and spindles to be sure that no foreign objects, such as wire or steel strapping bands, are wrapped around them.
2. Inspect blades for wear. Replace if necessary. Use only genuine Bush Hog replacement parts. If it is necessary to sharpen the blades, remove the blades from the spindles before sharpening. DO NOT sharpen blades while still attached to the mower.
3. Make sure all shields are in place and in good condition. Repair or replace any missing or damaged shields.
4. Perform lubrication per paragraph 4-2.
5. Listen for abnormal sounds, which might indicate loose parts, damaged bearings, or other damage. Correct any deficiency before continuing operation.
6. With the engine off, engage the blower assembly. Check the belt tension and inspect the pulley belt for cracks or tears.
7. Check for wear or deterioration of the upper or lower hoses. If there are any portions of the hose have been torn or worn through, replace with genuine Bush Hog replacement parts

After Each Use:

1. Clean all debris from machine especially from the container, underneath the belt shields and off safety decals. Replace any missing or illegible decals.
2. Inspect unit for worn or damaged components. Repair or replace before next use. Any replacement components installed during repair shall include the components current safety decal specified by the manufacturers to be affixed to the component.
3. Check belt for proper tension

Figure 19 Lubrication Points



4-2 Lubrication

NOTE: Use only white lithium base grease for lubrication of the shaft on the blower assembly and the idler pulley block.

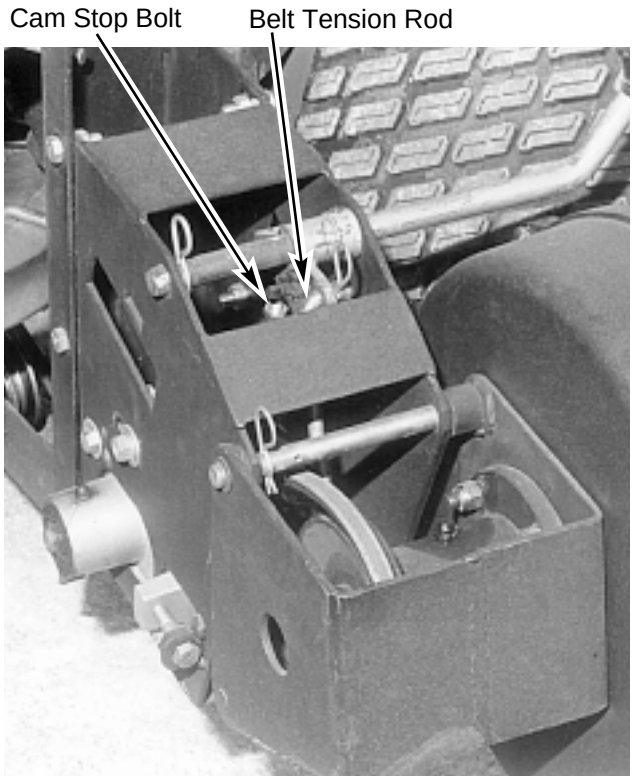
1. On initial use:
Grease the fittings on the blower and idler assembly. The Grease Fittings can be seen in Figure 19.

2. Every 25 Hours of use:
Regrease the Grease Fittings.

4-3 Cam Assembly Adjustment

The cam assembly, which controls the blower belt tension, comes from the factory pre-adjusted. If the belt is too tight or becomes too loose, remove the hair pin clip from the belt tension rod and pull the “L” end of the rod out of it’s hole in the cam assembly. The tension rod may then be screwed out to tighten the belt or screwed in to loosen the belt. Replace the “L” end into the top hole in the cam and replace the hair pin clip. Adjust the cam stop bolt to allow the cam to rotate slightly over center when the blower is disengaged. (Figure 20)

Figure 20 Cam Adjustment



SAFETY DECALS

To promote safe operation, Bush Hog supplies safety decals on all products manufactured. Because damage can occur to safety decals either through shipment, use or reconditioning, Bush Hog will, upon request, provide safety decals for any of our products in the field at no charge. Contact your authorized Bush Hog dealer for more information.

50031301

50031304

50031303

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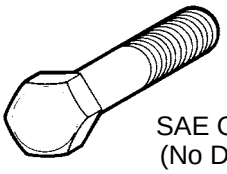
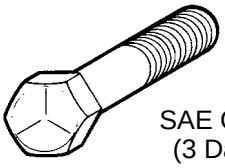
TORQUE SPECIFICATIONS

AMERICAN

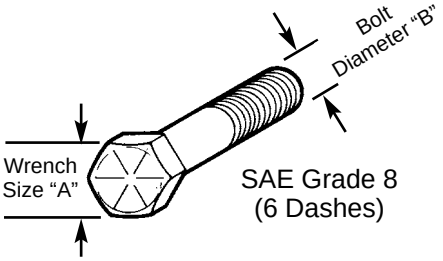
Bolt Head Markings



SAE Grade 2
(No Dashes)



SAE Grade 5
(3 Dashes)

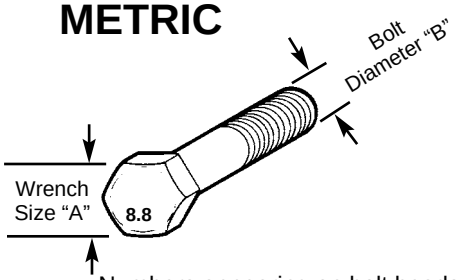


SAE Grade 8
(6 Dashes)

Proper toque for American fasteners used on Bush Hog equipment.
Recommended Torque in Foot Pounds (Newton Meters).*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 2O UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288(1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

METRIC



Numbers appearing on bolt heads indicate ASTM class.

*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.

Proper torque for metric fasteners used on Bush Hog equipment.
Recommended torque in foot pounds (newton Meters).*

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

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